



**PROCEEDINGS OF THE SYMPOSIUM
 “NEOGASTROPOD ORIGINS, PHYLOGENY, EVOLUTIONARY PATHWAYS
 AND MECHANISMS” HELD DURING THE 2007 WORLD CONGRESS OF
 MALACOLOGY, ANTWERP, BELGIUM, 15–20 JULY 2007
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Preface

By any measure, neogastropods are an extraordinary example of evolutionary success. They appeared abruptly, at least in recognizable form, during the Albian (100 mya), and radiated rapidly at a variety of taxonomic levels to become the dominant predatory gastropods in benthic marine communities from the tropics to the poles, from intertidal depths to the abyssal plain. Several groups have further extended their range into the ocean trenches and into fresh water.

These animals have been studied extensively, and from numerous perspectives. Their economic importance is considerable, both as a harvestable food source and as predators of other commercially important mollusks. Neogastropod glandular secretions have also been of significant importance through the ages. Production of Tyrian Purple from hypobranchial gland secretions of muricids by the Minoans and Phoenicians has been traced to the 20th–18th centuries BC. In the present day, conotoxins, produced by the venom glands of toxoglossans, are being extensively studied for proven and potential biomedical applications.

Phylogenetic studies on neogastropods abound at a variety of taxonomic levels. Because of the rapid proliferation of lineages, each with tendencies to modify organ systems in parallel, most major groups are well characterized morphologically, yet precious few characters have been identified that support relationships within and between them. The absence of congruent patterns of character distribution in major organ systems has confounded initial attempts at phylogenetic inference based on morphological characters. More recent studies using DNA sequences of nuclear and mitochondrial genes have also produced contradictory or equivocal results, while analyses of datasets combining molecular and morphological characters have fared only slightly better.

Despite considerable and concerted research effort spanning decades, there are few questions that can yet be answered with any degree of confidence. When it comes to the most basic questions, we know remarkably little about neogastropods. Such questions as what? when? where? how? and why? still intrigue us. When

rephrased in the language of modern biology, they become questions of monophyly, sister taxa, synapomorphies, fossil record, evolutionary rates, biogeography, as well as inquiries that call into question our understanding of basic evolutionary and genetic mechanisms. Answers to many of these questions still evade us.

The first workshop focusing on the systematics, phylogeny and biology of the Neogastropoda was convened in Menfi, Italy (June 14–18, 2000), and followed by workshops on neogastropods at the Smithsonian Marine Station at Fort Pierce, Florida (August 4–13, 2004) and the Smithsonian Tropical Research Institute at Naos, Panama (January 29–February 13, 2006). A fourth workshop will be hosted by Centro Nacional Patagónico (CENPAT) in Puerto Madryn, Argentina (November 9–13, 2009).

The papers in this volume were presented as part of the symposium on NEOGASTROPOD ORIGINS, PHYLOGENY, EVOLUTIONARY PATHWAYS AND MECHANISMS that was convened during the 16th World Congress of Malacology, held in Antwerp, Belgium, on August 16–17, 2007. Many of the participants in the neogastropod workshops were contributors to this symposium. The research presented here represents a broad spectrum of approaches to varied aspects of neogastropod evolution. We hope that these papers will shed light on some of the current questions, bring other unresolved issues into sharper focus and stimulate further research on this intriguing group of gastropods.

We are grateful to Prof. Dr. Thierry Backeljau and to the organizers of the Congress for the invitation to organize this symposium. Thanks are due to all of the participants who presented their research and to the many co-authors who were present, as well as to our many friends and colleagues who were unable to attend but nevertheless played a role in its success through their contributions.

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